

Advanced Mirror Material System, Phase II

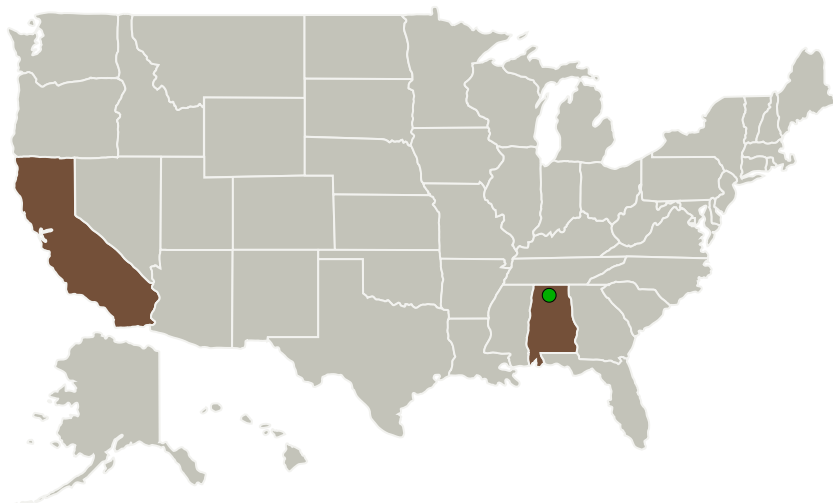
Completed Technology Project (2015 - 2017)



Project Introduction

Peregrine will bring together recent laboratory developments and mature the technology so that complete mirror and telescope assemblies can be reliably and robustly produced. This proposed innovation will lower the cost of space mirrors from their current state of the art of \$6.4 M/m² to less than \$1.6 M/m² while maintaining low weight, high stiffness and high performance for x-ray, neutron and UV/optical mirrors. The basis of this approach relies upon Be-38Al (a lower cost beryllium) to create a substrate, the use of coefficient of thermal expansion (CTE) matching phosphorous containing electroless nickel plating (NiP) to establish an amorphous surface, and then single point diamond turning (SPDT) that surface to a precision optical figure out to the edge of the substrate. Be-38Al provides a substrate material that can provide the same stiffness as beryllium because it is not limited by its fracture sensitivity like beryllium. Electroless nickel applied to Be-38Al with the right phosphorous content can match the Be-38Al's CTE, and the use of diamond turning can readily produce optical surfaces that can be used as is or with final polishing.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
The Peregrine Falcon Corporation	Lead Organization	Industry	Pleasanton, California
● Marshall Space Flight Center (MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	California

Images



Briefing Chart

Advanced Mirror Material System

Briefing Chart

(<https://techport.nasa.gov/image/128794>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

The Peregrine Falcon Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

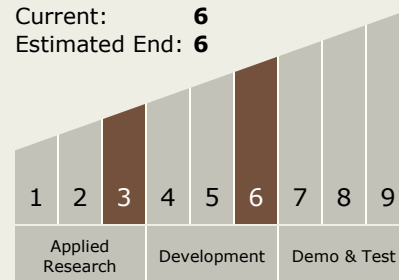
Robert Hardesty

Technology Maturity (TRL)

Start: 3

Current: 6

Estimated End: 6



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.2 Observatories
 - └ TX08.2.1 Mirror Systems

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System